**Annexure**

**Syllabus for Paper 2 of Phase I**

| Phase I | | | |
|---|---|---|---|
| **SN** | **Topic** | **Details** | **Weightage*** |
| 1. | Database Concepts | ER-model. Relational model: relational algebra, tuple calculus, Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees), Transactions and concurrency control. | 10 |
| 2. | SQL Queries | Select, view, truncate, delete, update, alter, Inner join, different types of outer joins,, use of aggregate functions, Union, intersection, except, in and exist clauses, nested queries | 10 |
| 3. | Programming Concepts (Java /C C++ ) | Program control (iteration, recursion, Functions), Scope of variables, Binding of variables & functions, Parameter passing, Functional and Logic Programming, OOPS Concepts, Inheritance, Class and object, Constructors, Functions, Exception Handling | 30 |
| 4. | Data Analytics Languages (Python / R) | Regex, Slicing, Data reshaping, Dataframes, Dictionaries and Sets, File Management, Classes and Functions, Data Mining, Lists, Importing and exporting data, charts and graphs | 10 |
| 5. | Algorithms for problem solving | Tree and graph traversals, Connected components, Spanning trees, Shortest paths; hashing, Sorting, Searching; Design techniques (Greedy, Dynamic Programming, Divide-and-conquer) | 10 |
| 6. | Networking Concepts | ISO/OSI stack, LAN Technologies (Ethernet, Token ring), TCP/UDP, IP, Basic concepts of switches, gateways, and routers, Application layer protocols (DNS, SMTP, POP, FTP, HTTP), Firewalls | 10 |
| 7. | Information & Cyber Security Concepts | Cyber Attacks, Software Development Security, Network security, Authentication, CIA - Confidentiality, Integrity and Availability, Network Audit, Systems Audit | 10 |
| 8. | Data warehousing | Data Extraction, Data Cleaning, Data Transformation, Data Loading, Metadata, Data Cube, Data Mart, Data Models, | 5 |
| 9. | Shell Programming | Shell Scripting Basics, Shell Variables, Shell Script Arguments, If Statement, Loop, Return, Basic UNIX commands | 5 |
| **Total** | | | **100** |

**\*** Weightages are indicative only

**Syllabus for Paper 2 of Phase II**

| SN | Topic | Concept | Weightage |
|---|---|---|---|
| **1** | Algorithms | Sorting, Searching, Greedy Algorithms, Dynamic Programming, Backtracking, Divide and Conquer, Pattern Searching | 30 |
| **2** | Data Structure | Array, Linked List, Stack, Queue, Binary Tree, Indexing, Binary Search Tree, Heap, Hashing, Matrix, JSON Objects | 40 |
| **3** | String Manipulation | Length, Substring, Regex, Search | 10 |
| **4** | Object Oriented Programming | Abstraction, Encapsulation, Polymorphism, Inheritance | 20 |
| **Total** | | | **100** |

**\*** Weightages are indicative only

**Paper 1 of Phase- II:- English Writing Skills**

The paper on English shall be framed in a manner to assess the writing skills including expression and understanding of the topic including precis writing/ essay writing/ comprehension.

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